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DATACOMPUTER SUPPORT OF SEISMIC DATA ACTIVITY

Computer Corporation of America

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DATACOMPUTER SUPPORT OF SEISMIC DATA ACTIVITY
Annual Technical Report

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13. ABSTRACT

DD FORM 1473 REPLACES DD FORM 1473, 1 JAN 64, WHICH IS
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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
datacomputer						
seismic data base						
seismic input processor (SIP)						
Ampex TBM						

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1. Overview

1.1 Project Goals

The purpose of the project is to support the ARPA-NMRO Seismic Data Activity by providing data storage and retrieval services. The Arpanet will be used as the communication channel. As part of the service, seismic data will be (a) collected from the Arpanet; (b) stored; and (c) made available to computers on the Arpanet in a convenient and timely manner. These services represent a special application of the Arpanet Datacomputer supported under Contract No. MDA903-74-C-0225.

The amount of data to be kept on-line necessitates the addition of a mass memory to the Datacomputer System. An Ampex Terabit Memory System (TBM) with a capacity of almost two hundred billion bits has been contracted for and will be installed at CCA in 1975.

Also needed for this project is a small Seismic Input Processor (SIP). The SIP will collect data over the network on a round-the-clock basis. It will reformat the data and buffer it. At regular intervals, the SIP will generate a datalanguage update request and burst the data to the Datacomputer via the TIP (see Figure 1).

1.2 Status of the Project

The activity on the project to date has been primarily in two areas: hardware acquisition and coordination with the seismic community.

CCA has been negotiating with Ampex for the purchase of the TBM Memory System to be incorporated into the Datacomputer. The initial configuration of the TBM will be one transport driver, two dual transport modules, one data channel, and a Communications and Control System (CCS). The CCS contains a

DIAL-UP LINES

DATACOMPUTER SYSTEM

TIP
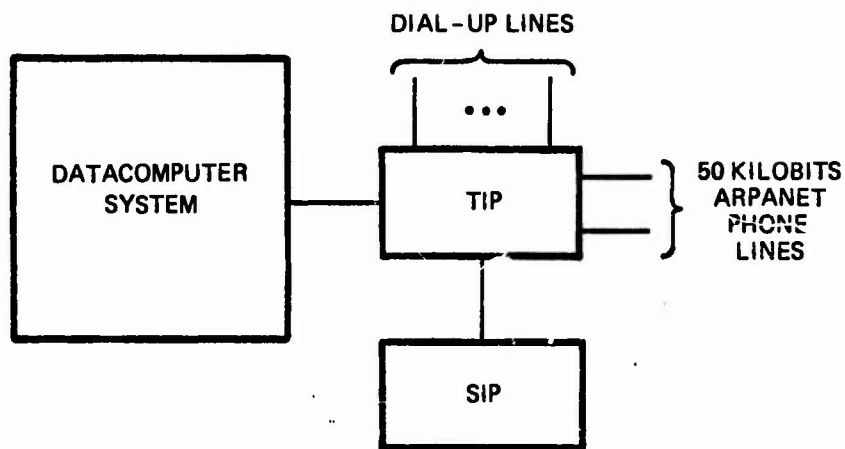
50 KILOBITS ARPANET PHONE LINES

SIP

Figure 1 - CCA Installation

Storage Control Processor and a Channel Interface Unit. The delivery of the TBM Memory System is expected to be in August 1975 and acceptance in September 1975.

The SIP hardware will consist of a DEC PDP-11/40 with 28K core, two RPO4 disks with a storage capacity of 176 million bytes, and an Arpanet interface. Installation of the PDP-11 and peripherals is expected to be January 1975. The SIP is expected to be interfaced to the Arpanet in March 1975.

CCA has worked closely with the seismic community to determine requirements for data storage and retrieval services. Efforts are under way to specify suitable file formats for storage of the seismic data. Thses formats reflect the way in which the data is collected, the way in which it will be used, and the most efficient ways of using the Datacomputer hardware and software.

In order to gain operational experience with seismic data, several sample seismic databases have been loaded onto the Datacomputer. Data from the International Seismic Month has been used for demonstration purposes. A tape of seismic data supplied by SDAC has been loaded for debugging purposes. This data is long period array data from ALPA.

Efforts are also under way to determine the specification of the CCP-SIP protocol. This is a special-purpose protocol that will allow for faster transmission of real-time data than the standard host-host protocol.

2. TBM

In order to satisfy the requirement for a large, on-line
seismic file, an Ampex Terabit Memory System (TBM) will
be installed at CCA, as a part of the Datacomputer. The
basic system is described in Appendix E of our proposal,
"Datacomputer Support of Seismic Data Activity," submitted
August 13, 1973.

An alternative method of interfacing the TBM to the CCA
PDP-10 has been developed. This approach involves the
use of a PDP-11/05 in addition to special interface hard-
ware to provide interfacing and control functions for the
TBM. The channel interface unit interprets and executes
instructions from the PDP-10 via an SA-10 IBM-compatible
channel, as well as commands typed at the channel interface
unit operating console. The advantage of this new approach
is that much of the overhead involved in controlling the
TBM is moved from the PDP-10 into the channel interface unit,
freeing CPU resources at the PDP -10.

Contract negotiations were conducted during the current
reporting period and are nearing completion.

Ampex and CCA are cooperating in facilities specification for
the TBM. TBM requirements for power, air conditioning, floor
height and other environmental factors must be determined.
Once this task is done, site preparations for the TBM can
begin.

3. SIP

Seismic data will be collected from the Arpanet and buf-
fered by a small Seismic Input Processor (SIP) before
retransmission to the Datacomputer. The SIP will have two
3330-type spindles, which allow for 24-hour buffering of
a 15-kilobit per second data stream. This will ease re-
quirements for both the Datacomputer and the Central
Communications Processor (CCP) at SDAC.

The SIP will be a host on CCA's IMP. The SIP will communicate
with the Datacomputer as any other host would, that is, using
datalanguage, network data connections, and the standard
Arpanet host-host protocol. Transfer rates will be much
higher than normal network communication, however, since no
phones lines are involved.

The SIP will communicate with the CCP at SDAC using a data
transfer protocol which is being specially developed for this
purpose. This protocol will be more efficient for real-time
data than the standard Arpanet host-host protocol. CCA
continues to coordinate with VSC and BBN in specifying the
CCP-SIP protocol.

The SIP hardware specifications, including on-line storage
capacity, bandwidth, system software, Arpanet interface, and
the like, are described in "Specifications for the Seismic
Input Processor (SIP)", dated June 27, 1974. After contacting
several vendors, a DEC PDP-11/40 was chosen. The configura-
tion will include 28K core and two RP04 disks.

4. Coordination with the Seismic Community

The amount of seismic data to be collected necessitates
that the data be handled as efficiently as possible if the
application is to be feasible. Design of the application
requires a thorough understanding of how the data is to
be collected and how it is to be used. Towards this end,
CCA has worked closely with VSC, SDAC, BBN, and others to
identify the data storage and retrieval requirements for the
seismic application.

Work continues towards specifying the file formats for the
seismic data. The bulk of the data is the raw waveforms.
It will be segmented into files, each one of which will
contain a day's worth of data. This is a size that is
convenient both for the Datacomputer and for a seismologist
who is analyzing the data. The data is organized first by
site and then by time.

CCA has obtained seismic data from SDAC that corresponds to
the information to be stored in the Array Long Period File.
This data has been loaded into the Datacomputer, and the
user program SMART will be modified to access the data.
This will give us operational experience with the seismic
data and the proposed file formats.